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gravity itself, and will have to be considered in all theories relating to finely divided matter at least.

It is perhaps not too much to expect that ere long we shall know much more of this new property of light and heat, especially its relations to different wave-lengths.

C. D. PERRINE.

MT. HAMILTON, CALIFORNIA, March 19, 1902.

ORIGIN OF A DISTURBED REGION OBSERVED IN THE CORONA  
OF 1901, MAY 17-18TH.

One of the most conspicuous features of the recent eclipse was an area of disturbance in the Corona off the east limb, to which I called attention in my first reports.\*

The disturbance had the form of an inverted cone, with its apex on or very near the Sun's limb. It had the appearance of being composed of cloudlike masses of matter, arranged in such a manner as we should expect if it were the result of an eruption on the Sun's surface. In fact, the appearance alone very strongly suggests such an origin. Close to the apex of this region is a long, slender prominence, almost tangential to the limb, which seems to have had its origin at the same point as the coronal disturbance.

No spots or unusual faculæ had been observed just previous to the eclipse, nor were any observations or photographs available until recently with which to investigate the question of origin. Through the kindness of the Astronomer Royal, Royal Observatory, Greenwich, the Lick Observatory has been supplied with copies on glass of the negatives of the Sun taken at Dehra Dûn, India, on May 17, 18, 19, 20, 21, 22, 26, and 28, 1901. These photographs are on a scale of  $7\frac{1}{2}$  inches to the solar diameter and furnish the requisite data.

The photographs of May 17th and 18th show no spots or other evidences of unusual activity on any part of the Sun's disc. On the photograph of May 19th, however, is a spot of medium size which has just appeared around the east limb. Owing to foreshortening, the spot, on this date, is little more than a line  $\frac{1}{2}'$  in length, surrounded by faculæ. On the 20th it is  $\frac{3}{4}'$  in length (north and south), and is followed at a distance of  $\frac{1}{2}'$  by several small spots, forming a close group.

The principal spot is compact, with well-defined umbra and

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\* Lick Observatory *Bulletin*, No. 9. *Publications A. S. P.*, Vol. XIII, p. 196.

penumbra, and shows no unusual changes during the interval covered by the photographs. The group of small spots following, however, shows considerable growth.

The following coordinates of the principal spot have been deduced from the plates of May 19th and 28th, the longitudes being measured from the center of the disc:—

	Greenwich Civil Time.	Longitude.	Latitude.
1901 May 19,	3 <sup>h</sup> 30 <sup>m</sup> 37 <sup>s</sup>	80°.7 East	+ 9°.0
28,	7 29 37	46 .7 West	+ 9 .0

From these positions, the spot was found to occupy the following position at the time of the eclipse in Padang:—

	Greenwich Mean Time.	Longitude.	Latitude.
1901 May 17,	17 <sup>h</sup> 40 <sup>m</sup> 37 <sup>s</sup>	93°.8 East	+ 9°.0

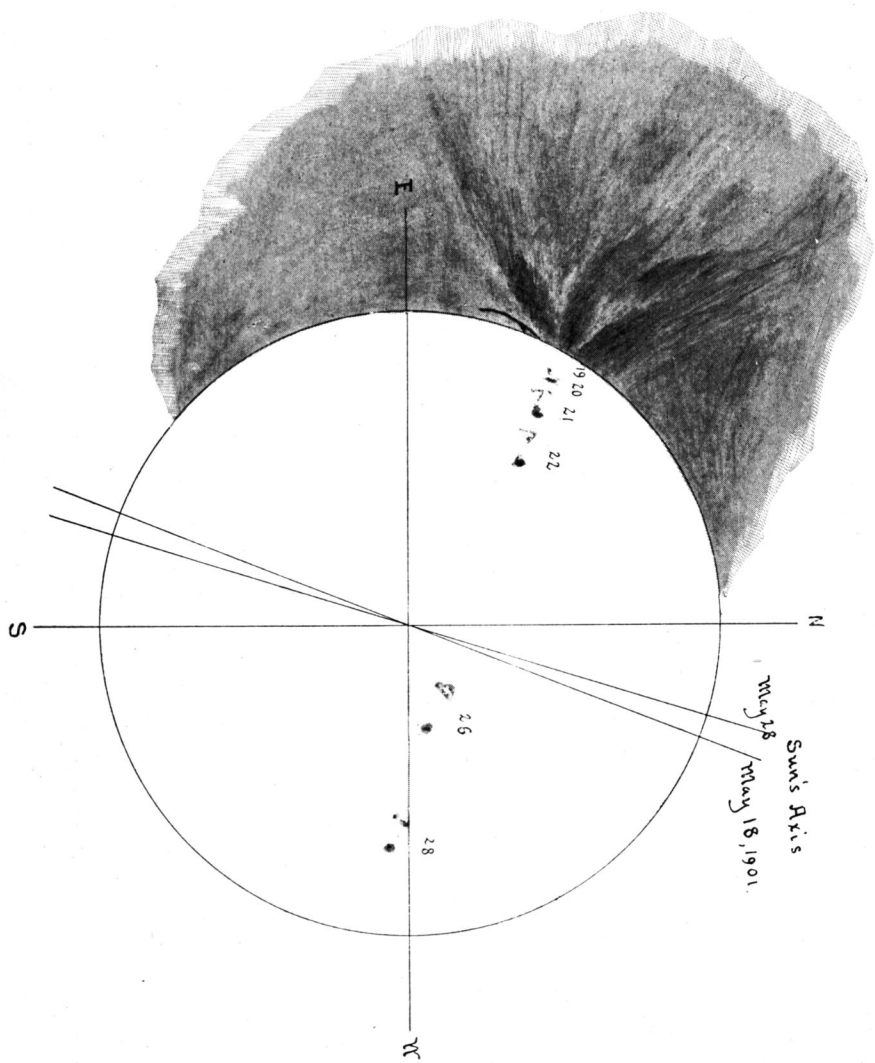
Thus the spot was on the opposite side of the Sun at the time of the eclipse and within 4° of the limb. Following are the position-angles of the spot as projected on the limb, and of the apex of the disturbed area in the corona observed on the eclipse negatives.

	Position Angle.
Sun-spot .....	60°.2
Apex of coronal disturbance ....	60 .0

During the period of eleven days covered by the photographs, only this one group of spots was visible. In this time almost the entire solar surface was under observation.

From the above position-angles it is seen that this group of sun-spots occupied the same line of sight as the apex of the disturbed coronal region. The accompanying illustration makes this clear. The spots have been copied from the Dehra Dûn photographs, and the principal masses of the coronal disturbance were sketched in to the same scale, from the eclipse negatives taken with the 40-foot camera.

We have no means of determining the position *in the line of sight* of the apex of the coronal disturbance other than that afforded by the angle of the cone-shaped area. This indicates an origin near the limb. It can, therefore, hardly be doubted that this disturbed region in the corona was in reality immediately above the group of sun-spots and faculæ, and that it had its origin in the same disturbance of the Sun's surface. The long, threadlike prominence alluded to seems likewise to have originated in the same group of spots and faculæ.



These observations indicate very strongly the intimate connection of all solar phenomena. Sun-spots, faculæ, prominences, and corona all seem, in this instance at least, to have had a common origin.

The undoubted connection of this coronal disturbance with the group of spots and faculæ on the surface, and its appearance so strongly suggested great activity, that a set of measurements was made of some of the best-defined masses to see if motion could be detected. The greatest interval of time available between photographs of the corona suitable for this purpose was but slightly over five minutes; yet velocities of 50 or 100 miles per second should be easily detected. The results fail to show any certain indication of motion. The uncertainties of measurement of such masses are so large, however, that velocities of 5 or 10 miles per second would not be detected. It may be said with confidence that the velocities at right angles to the line of sight were not as great as 20 miles per second. A comparison of negatives of the corona extending over a larger interval of time—e. g., those secured in Mauritius and Sumatra—would be valuable in this connection.

C. D. PERRINE.

MT. HAMILTON, CALIFORNIA, 1902, March 17th.

ASTRONOMICAL TELEGRAMS.

(*Translations.*)

CAMBRIDGE, MASS., Feb. 2, 1902.

To Lick Observatory: (Received 4:30 P.M.)

Kiel cables that SCHWAB's *Algol* variable 93,1901, will be at minimum on Feb. 3.89 Green. M. T. Its period is 3.38 days.

(Signed) E. C. PICKERING.

CAMBRIDGE, MASS., Feb. 4, 1902.

To Lick Observatory: (Received 6:35 P.M.)

HALE telegraphs that PARKHURST found SCHWAB's variable to be of magnitude 8.45 at 23<sup>h</sup> 46<sup>m</sup> G. M. T. Feb. 3; and of magnitude 8.10 at 0<sup>h</sup> 29<sup>m</sup> G. M. T. Feb. 4.

(Signed) E. C. PICKERING.

MOUNT HAMILTON, CAL., Feb. 10, 1902.

To Harvard College Observatory,  
Cambridge, Mass. (Sent 9:45 A.M.)

PERRINE finds that the remarkable coronal disturbance seen